Green Steel Wheels Rollling

- **Amitabh Kant**

Last year, the European Commission announced it would apply a levy on imports from 2026 in five sectors - iron and steel, cement, fertilisers, aluminium and electricity generation - from non-EU countries considered having less strict climate rules. This development, among others, provides India and opportunity to take advantage of utilising disruptive climate technologies in its steel industry.

As with any industrializing economy, the steel sector is of vital importance to India's economy, contributing around 2% to the country's GDP and employing around 2.5 million people in the steel and related sectors.

India is currently the world's second-largest steel producer with more than 100 MMTPA capacity with ambitions to reach 300 MMTPA capacity by 2030, and third-largest steel consumer.

The iron and steel sector are, responsible for 7% of global energy-related emissions. India contributes almost 9% to the global steel industry emissions. India's average emission intensity is 2.5 tonne CO2/tonne of crude steel against a global average of 1.85.

However, India's steel consumption per capita is only 27% of the world average. It is obvious that Indian steel demand is going to radically increase in the coming decade. But, if this demand is met by carbon heavy steel – then Indian steel industry runs the risk of carbon taxes in European Union – effectively shutting down India's exports.

Even domestically, with the Prime Minister Modi's focus on LiFE (Lifestyle for Environment), individual behaviour change and sustainable lifestyle – the young generation will in coming years want only sustainable products. It is clear that without sustainable steel, there cannot be a sustainable India. In a recent report entitled "Harnessing Green Hydrogen: Opportunities for Deep Carbonization in India" it is envisaged that India should create the world's largest production capacity of green steel at 15-20 million tonnes by 2030 — a pioneering effort to make green steel mainstream for the world.

In LED lighting, India demonstrated that it can push a disruptive technology from the early adoption phase to ubiquitous deployment in record time. In a recent tender of 5450 Electric Buses (EV) for six cities it has been

demonstrated that aggregation, size and scale can lead to price of EV buses being lower than combustion vehicles. Similarly, India has the opportunity now to accelerate innovation and scale-up deployment of green steel via green hydrogen production technology. This is critical as electricity accounts for less than a quarter of India's energy economy. There is an urgent need to prepare the rest of the energy economy fuelled by $160 billion of imported hydrocarbons for deep de-carbonisation. These are the hard to abate sectors like refineries, fertilizer, steel, cement and long distance transportation.

There is a pioneering role being played to bring together 23 credible industrial players such as Iberdola, Volvo and AP Moller maersk to commit to buy 100% net-zero steel by 2050 along with ambitious 2030 commitments. This will be an encouraging market signal for value chain steel manufacturers to go green.

When it comes to net-zero, green steel - in addition to modifications required in the production technology, stakeholders fully understand that procurement of green steel requires a green premium to be paid by the consumer. This is what happened in the solar sector where prices radically fell from Rs. 22/Kwh to less than Rs. 2/kwh. Technology, innovation and scale were responsible for prices falling sharply. Industry in India is highly dynamic and has immense capability to innovate. I am therefore optimistic that our companies will adopt green steel in a phased manner and ensure that they are an integral part of global supply chains.

The main production routes for steel in India are coal based blast furnace (45%), electric arc furnace (26%) and induction furnace (29%). On the other hand, natural gas based steel is affected by the limited availability of domestic gas supplies and the high cost of imported gas. This necessitates alternate solutions and the steel industry is at an inflection point to reduce emissions.

Decarbonisation of steel to reach net-zero requires the following three critical steps: firstly, Improving efficiency across operations; secondly, use of renewable electricity where ever feasible; and thirdly, use of zero carbon reducing agents such as green hydrogen.

Globally green hydrogen is considered as a technically viable option to achieve zero-carbon emission in the iron ore reduction process which is highly carbon intensive. Groups such as H2-green steel in Denmark and GravitHy – a consortium that involves primetals, Plug Power and Engie are pioneering Hydrogen based Direct Reduction of Iron (H2-DR) technology that uses pure green hydrogen. This makes the iron ore reduction process to steel emissions free.

There has been estimation on the cost impact of H2-DR in the Indian scenario. Based on the analysis, the delivered costs of hydrogen would need to be between $2.5–3.5/kg to be competitive with coal based steel. This is a highly viable proportion.

With proactive collaboration among innovators, entrepreneurs and government, green hydrogen has the potential to drastically reduce CO2 emissions in steel manufacturing, fight climate change, and put India on a path towards net-zero energy imports. It will also help India export high-value green steel products, making it one of the first major economies to industrialise without the need to 'carbonise'. It also has the potential to make India the champion of green steel manufacturing.

**Author is G-20 Sherpa & ex-CEO, NITI Aayog. Views expressed are personal.*